



ALTERNATIVE TO PTO/SB/08a/b (08-03)

Substitute for form 1449/PTO				Complete If Known	
				Application Number	10/617,624
				Filing Date	July 10, 2003
				First Named Inventor	Eduardo Blumwald
				Art Unit	1638
				Examiner Name	To Be Assigned VINOD KUMAR
Sheet	1	of	6	Attorney Docket Number	529642000500

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
W	1.	US 4,616,100	10-07-1986	McHughen et al.	
W	2.	US 5,272,085	12-21-1993	Young et al.	
W	3.	US 5,346,815	09-13-1994	Krulwich et al.	
W	4.	US 5,441,875	08-15-1995	Hediger	
W	5.	US 5,563,246	10-08-1996	Krulwich et al.	
W	6.	US 5,563,324	10-08-1996	Tarczynski et al.	
W	7.	US 5,639,950	06-17-1997	Verma et al.	
W	8.	US 5,689,039	11-18-1997	Becker et al	
W	9.	US 5,750,848	05-12-1998	Kruger et al.	
W	10.	US 5,780,709	07-14-1998	Adams et al	
W	11.	US 5,859,337	01-12-1999	Gasser et al.	
W	12.	US 6,861,574	03-01-2005	Fukuda et al.	
W	13.	US 20030046729 A1	03-06-2003	Blumwald et al.	
W	14.	US 20050028235 A1	02-03-2005	Zhang et al.	
W	15.	US 20050032112 A1	02-10-2005	Fukuda et al.	
W	16.	US 20050144666 A1	06-30-2005	Blumwald et al.	
W	17.	US 20050155105 A1	07-14-2005	Blumwald et al.	
W	18.	US 11/065,977	FD 02-24-2005	Blumwald et al.	
W	19.	US 10/620,061	FD 07-14-2003	Blumwald et al.	

FOREIGN PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)			
W	20.	EP 1143002 A1	10-10-2001		
W	21.	WO 91/06651	05-16-1991		
W	22.	WO 96/39020	12-12-1996		
W	23.	WO 97/13843	04-17-1997		
W	24.	WO 99/47679	09-23-1999		
W	25.	WO 00/37644	06-29-2000		

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Examiner Signature	Vinod Kumar	Date Considered	9/1/2005
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sf- 1866952

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NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (In CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.			T <sup>2</sup>
VK	26.	AL-KARAKI, Ghazi N. (2000) "Growth, Water Use Efficiency, and Sodium and Potassium Acquisition by Tomato Cultivars Grown Under Salt Stress," Journal of Plant Nutrition, 23(1):1-8			
VK	27.	APSE ET AL. (2002) "Engineering salt tolerance in plants" Current Opinion in Biotechnology 13: pp. 146-150.			
VK	28.	APSE ET AL. (1999) "Salt tolerance conferred by overexpression of a vacuolar Na <sup>+</sup> /H <sup>+</sup> antiport in Arabidopsis" Science 285 (5431): pp. 1256-1258.			
VK	29.	APSE ET AL. (1998) "Cloning and Characterization of Plant Sodium/Proton Antiports" 11 International Workshop on Plant Membrane Biology, August 1998, Cambridge, U.K. (Abstract).			
VK	30.	APSE ET AL. (1998) "Identification of two putative sodium/proton antiports in Arabidopsis" Plant Membrane Biology Workshop August 1998, Cambridge, U.K. (Poster).			
VK	31.	APSE, Maris et al. (Jun. 1998) "Cloning and Characterization of a Plant Sodium/Proton Antiport," Annual Meeting of the American Society of Plant Physiologists, Madison, Wisconsin, USA. (abstract)			
VK	32.	BARKLA ET AL. (1995) "Tonoplast Na <sup>+</sup> /H <sup>+</sup> antiport activity and its energization by the vacuolar H <sup>+</sup> -ATPase in the halophytic plant Mesembryanthemum crystallinum L" Plant Physiol. 109: pp. 549-556.			
VK	33.	BARKLA ET AL. (1994) "The plant vacuolar Na <sup>+</sup> /H <sup>+</sup> antiport" Symp. Soc. Exp. Biol. 48: pp. 141-153.			
VK	34.	BLUMWALD (2000) "Sodium transport and salt tolerance in plants" Current Opinion in Cell Biology 12: pp. 431-434.			
	35.	BLUMWALD ET AL. (Dec. 1998) "Cloning of plant sodium/proton antiports in Arabidopsis" Eastern Regional Meeting of the Canadian Society of Plant Physiologists, Toronto. (Oral Presentation)			
	36.	BLUMWALD ET AL. (Jun. 1998) "Cloning and Characterization of a Plant Sodium/Proton Antiport" Annual Meeting of the American Society of Plant Physiologists, Madison, Wisconsin, USA. (Oral Presentation)			
	37.	BLUMWALD ET AL. (Aug. 1998) "Cloning and characterization of a plant sodium/proton antiports" 11 International Workshop on Plant Membrane Biology, August 1998, Cambridge, U.K. (Oral Presentation)			
	38.	BLUMWALD ET AL. (Aug. 1998) "Cloning and characterization of a plant sodium/proton antiports" Gordon Conference on Drought and Salinity Stress in Plants, Oxford, UK. (Oral Presentation)			
VM	39.	BOHNERT ET AL. (1996) "Strategies for engineering water-stress tolerance in plants" Trends in Biotechnology 14(3): pp. 89-97.			

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Sheet	3	of	6	Attorney Docket Number	529642000500

<input checked="" type="checkbox"/>	40.	BORGESE ET AL. (1992) "Cloning and expression of a cAMP-activated Na+/H+ exchanger: evidence that the cytoplasmic domain mediates hormonal regulation" PNAS USA 89: pp. 6765-6769.	
<input checked="" type="checkbox"/>	41.	BORK (2000) "Powers and Pitfalls in Sequence Analysis: the 70% Hurdle" Genome Research, Vol. 10: pp. 398-400.	
<input checked="" type="checkbox"/>	42.	BOWIE ET AL. (1990) "Deciphering the Message in Protein Sequences: Tolerance to Amino Acid Substitutions" Science, Vol. 247, pp. 1306-1310.	
<input checked="" type="checkbox"/>	43.	BRANT ET AL. (1997) Human Na+/H+ exchanger isoform NHE3 composite cDNA: GenBank Accession Number T51330.	
<input checked="" type="checkbox"/>	44.	BROUN ET AL. (1998) "Catalytic Plasticity of Fatty Acid Modification Enzymes Underlying Chemical Diversity of Plant Lipids" Science, Vol. 282: pp. 1315-1317.	
<input checked="" type="checkbox"/>	45.	COUNILLON ET AL. (May 1993) "A Point Mutation of the Na+/H+ Exchanger Gene (NHE1) and Amplification of the Mutated Allele Confer Amiloride Resistance Upon Chronic Acidosis" Proc. Natl. Acad. Sci. USA 90(10): pp. 4508-12.	
<input checked="" type="checkbox"/>	46.	COVITZ ET AL. (Nov. 1997) Expressed sequence tags from a root hair-enriched <i>Medicago truncatula</i> cDNA library: GenBank Accession Number AA660573.	
<input checked="" type="checkbox"/>	47.	CUARTERO, Jesus et al. (1999) "Tomato and Salinity," Scientia Horticulturae, 78:83-125	
<input checked="" type="checkbox"/>	48.	DANTE ET AL. (1997) "AF007271": <i>Arabidopsis thaliana</i> BAC TM021B04: EMBL Database Accession Number AF007271.	
<input checked="" type="checkbox"/>	49.	DARLEY ET AL. (1998) "ANA1 a Na+/H+ Antiporter From <i>Arabidopsis</i> ?" 11th International Workshop on Plant Membrane Biology, August 1998, Cambridge, U.K.	
<input checked="" type="checkbox"/>	50.	DIETRICH ET AL. (1997) Sequence of <i>s. cerevisiae</i> lambda 3641 and cosmids 9461, 9831, and 9410: GenBank Accession Number 927695.	
<input checked="" type="checkbox"/>	51.	FUKUDA ET AL. (Aug. 1999) "AB021878" <i>Oryza sativa</i> (Japonica cultivar-group) OsNHX1 mRNA: EMBL Database Accession Number AB021878.	
<input checked="" type="checkbox"/>	52.	FUKUDA ET AL. (1999) "Molecular Cloning and Expression of the Na+/H+ Exchanger Gene in <i>Oryza Sativa</i> " Biochim. Biophys. Acta. 1446 (1-2): pp. 149-55.	
<input checked="" type="checkbox"/>	53.	FUKUDA ET AL. (1998) "Na+/H+ Antiporter in Tonoplast Vesicles from Rice Roots" Plant Cell Physiol. 39: pp. 196-201.	
<input checked="" type="checkbox"/>	54.	FUKUDA ET AL. (Mar. 2001) "The Functional analysis of the rice Na+/H+ antiporter gene" Plant Cell Physiol. 42 (Supp.): p. s210.	
<input checked="" type="checkbox"/>	55.	GAXIOLA ET AL. (1999) "The <i>Arabidopsis thaliana</i> proton transporters, AtNhX1 and Avp1, can function in cation detoxification in yeast" PNAS USA 96 (4): pp. 1480-1485.	
<input checked="" type="checkbox"/>	56.	GAXIOLA ET AL. (1999) "AF106324" <i>Arabidopsis thaliana</i> sodium proton exchanger NhX1 mRNA, partial cds.: GenBank Accession Number AF106324	
<input checked="" type="checkbox"/>	57.	GISBERT, Carmina et al. (May 2000) "The Yeast HAL1 Gene Improves Salt Tolerance of Transgenic Tomato," Plant Physiology, 123:393-402	
<input checked="" type="checkbox"/>	58.	GORDON-KAMM ET AL. (1990) "Transformation of Maize Cells and Regeneration of Fertile Transgenic Plants" Plant Cell 2: 603-618.	
<input checked="" type="checkbox"/>	59.	GUO, Haiwei H. et al. (June 22, 2004) "Protein Tolerance to Random Amino Acid Change," PNAS, 101(25):9205-9210	

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✓	60.	HAHNNENBERGER ET AL. (1996) "Functional expression of the Schizosaccharomyces pombe Na+/H+ antiporter gene, sod2, in Saccharomyces cerevisiae" PNAS USA 93: pp. 5031-5036.	
✓	61.	HIEI ET AL. (1994) "Efficient Transformation of rice mediated by Agrobacterium and sequence analysis of the boundary of the T-DNA" Plant J. 6: pp. 271-82.	
✓	62.	HILL ET AL. (1998) "Functional Analysis of Conserved Histidines in ADP-Glucose Pyrophosphorylase from Escherichia coli" Biochem. Biophys. Res. Comm. 244: pp. 573-577.	
✓	63.	ICHIDA et al. (1996) "Increased Resistance to Extracellular Cation Block by Mutation of the Pore Domain of the Arabidopsis Inward-rectifying K+ Channel KAT1" J. Membrane Biol. 151: pp. 53-62.	
✓	64.	JACOBY (Aug. 23, 1999) "Botanists design plants with a taste for salt" Chemical Engineering News: p. 9.	
✓	65.	KADYRZHANOVA ET AL. (1995) Sequences for STS primer sets: GenBank Accession Number L44032.	
✓	66.	KAUFMAN (July 31, 2001) "A New Strain of Tomatoes, And Don't Hold the Salt" Washington Post: p. A03.	
✓	67.	KINCLOVA ET AL. (2001) "Functional study of the Saccharomyces cerevisiae Nha1p C-terminus" Mol. Microbiol. 40 (3): pp. 656-668.	
✓	68.	LAZAR ET AL. (1988) "Transforming Growth Factor a: Mutation of Aspartic Acid 47 and Leucine 48 Results in Different Biological Activities" Molecular and Cellular Biology 8: pp. 1247-1252.	
✓	69.	LIU ET AL. (2000) "Partial Deletion of a Loop Region in the High Affinity K+ Transporter HKT1 Changes Ionic Permeability Leading to Increased Salt Tolerance" J. Biol. Chem. 275 (36): pp. 27924-27932.	
✓	70.	MASER, Pascal et al. (2001) "Phylogenetic Relationships within Cation Transporter Families of Arabidopsis," Plant Physiology, 126:1646-1667	
✓	71.	MURPHY, L. et al. (Nov. 4, 1998) "Direct Submission Schizosaccharomyces Pombe Chromosome I Sequencing Project," GenBank Accession No. 3850064	
✓	72.	NASS ET AL. (Aug. 1998) "Novel Localization of a Na+/H+ Exchanger in a late Endosomal Compartment of Yeast" J. Biol. Chem. 273 (33): pp. 21054-60.	
✓	73.	NASS ET AL. (Oct. 1997) "Intracellular Sequestration of Sodium by a Novel Na+/H+ Exchanger in Yeast Is Enhanced by Mutations in the Plasma Membrane H+ - ATPase" J. Biol. Chem. 272 (42): pp. 26145-26152.	
✓	74.	NEWMAN ET AL. (1998) "AC T75860": Arabidopsis cDNA clone of Lambda-PRL2: EMBL Database Accession Number AC T75860.	
✓	75.	NUMATA ET AL. (Mar. 1998) "Identification of a Mitochondrial Na+/H+ Exchanger" J. Biol. Chem. 273 (12): pp. 6951-9.	
✓	76.	O'CONNOR (Aug. 14, 2001) "Altered Tomato Thrives in Salty Soil" New York Times.	
✓	77.	OHKI ET AL. (1995) "AC D49589": EMBL Database Accession Number AC D49589.	

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<i>h</i>	78.	OHKI ET AL. (1995) "Preference of recombination sites involved in the formation of extrachromosomal copies of the human alphoid Sau3A repeat family" Nucleic Acids Res. 23: pp. 4986-4994. <i>4971 - 4977</i> .	
<i>h</i>	79.	OHTA, Masaru et al. (2002) "Introduction of a Na+/H+ Antiporter Gene from <i>Atriplex Gmelini</i> Confers Salt Tolerance to Rice," FEBS Letters 26785:1-4	
<i>h</i>	80.	ORLOWSKI AND GRINSTEIN (Sep. 1997) "Minireview: Na+/H+ Exchangers of Mammalian Cells" J. Biol. Chem. 272 (36): pp. 22373 - 22376.	
<i>h</i>	81.	PLANTSP (2002) "PlantsP: Functional Genomics of Plant Phosphorylation-PlantsP Protein 27103" Retrieved (Feb 5, 2005) from <i>Jan 26, 2005</i> <a href="http://plantsp.sdsc.edu/cgi-bin/detail.cgi?db=plantsp&amp;plantsp_id=27103">http://plantsp.sdsc.edu/cgi-bin/detail.cgi?db=plantsp&amp;plantsp_id=27103</a> .	
<i>h</i>	82.	RAUSCH ET AL. (1996) "Salt stress responses of higher plants: The role of proton pumps and Na+/H+ -antiporters" Journal of Plant Physiology 148 (3-4): pp. 425-433.	
<i>h</i>	83.	RHOADS ET AL. (1998) "Regulation of the cyanide-resistant alternative oxidase of plant mitochondria" J. Biol. Chem. 273 (46): pp. 30750-30756.	
<i>h</i>	84.	RUBIO ET AL. (1999) "Genetic Selection of Mutations in the High Affinity K+ Transporter HKT1 That Define Functions of a Loop Site for Reduced Na+ Permeability and Increase Na+ Tolerance" J. Biol. Chem. 274 (11): pp. 6839-6847.	
<i>h</i>	85.	RUS, A.M. et al. (2001) "Expressing the Yeast HAL1 Gene in Tomato Increases Fruit Yield and Enhances K+/Na+ Selectivity Under Salt Stress," Plant, Cell and Environment, 24:875-880	
<i>h</i>	86.	SANTA-MARIA, Guillermo E. et al. (Dec. 1997) "The HAK1 Gene of Barley is a Member of a Large Gene Family and Encodes a High-Affinity Potassium Transporter," The Plant Cell, 9:2281-2289	
<i>Vh</i>	87.	SASAKI ET AL. (Apr. 1998) Rice cDNA from panicle C91832: Genbank Accession Number C91832. <i>04 April 2002</i>	
<i>Vh</i>	88.	SASAKI ET AL. (Apr. 1998) Rice cDNA from panicle C91861: GenBank Accession Number C91861.	
<i>h</i>	89.	SCHACHTMAN ET AL. (1997) "Molecular and functional characterization of a novel low-affinity cation transporter (LCT1) in higher plants" PNAS USA 94: pp. 11079-11084.	
<i>Vh</i>	90.	SEKI ET AL. (2002) RAFL6 Arabidopsis thaliana cDNA clone: GenBank Accession Nos.: AV785096 and AV798305.	
<i>Vh</i>	91.	STRATHMANN ET AL. (1989) "Diversity of the G-protein family: sequences from five additional alpha subunits in the mouse" Natl. Acad. Sci. USA 86: pp. 7407-7409.	
<i>Vh</i>	92.	TRAVIS, J. (Aug. 4, 2001) "Gene Makes Tomatoes Tolerate Salt," Science News, 60:68	
<i>Vh</i>	93.	WADITEE ET AL. (2001) "Halotolerant Cyanobacterium <i>Aphanothecce Halophytica</i> Contains an Na+/H+ Antiporter, Homologous to Eukaryotic Ones, with Novel Ion Specificity Affected by C-terminal Tail" J. Biol. Chem. 276 (40): pp. 36931-36938.	
<i>Vh</i>	94.	WEST, D.W. et al. (1984) "Response of Six Grape Cultivars to the Combined Effects of High Salinity and Rootzone Waterlogging," J. Amer. Soc. Hort. Sci. 109(6):844-851	

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<i>VK</i>	95.	WOOD ET AL. (Nov. 1998) Direct submission schizosaccharomyces pombe chromosome I sequencing project: GenBank Accession Number CAB10103.	
<i>VK</i>	96.	YAMAMOTO ET AL. (Oct. 1998) Rice cDNA from green shoot: GenBank Accession Number AU032544.	
<i>VK</i>	97.	YOKOI ET AL. (2002) Arabidopsis thaliana Na+/H+ exchanger 5 (NHX5) mRNA: GenBank Accession Number AF490589.	
<i>VK</i>	98.	ZANDONELLA (Jul. 2001) "Gene modified tomato revels in salty soils" New Scientist. Retrieved Feb. 23, 2002, from < <a href="http://www.newscientist.com/channel/health/gm-food/dn1092">http://www.newscientist.com/channel/health/gm-food/dn1092</a> >.	
<i>VK</i>	99.	ZHANG ET AL. (2001) "Engineering salt-tolerant Brassica plants: Characterization of yield and seed oil quality in transgenic plants with increased vacuolar sodium accumulation" PNAS USA 98 (22): pp. 12832-12836.	
<i>VK</i>	100.	ZHANG ET AL. (2001) "Transgenic salt-tolerant tomato plants accumulate salt in foliage but not in fruit" Nature Biotechnology 19: pp. 765-768.	

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